

What is claimed is:

1. A semiconductor device comprising:

a printed wiring board having a top surface, and a backside surface, on the side of the printed wiring board, opposite from the top surface;

a second semiconductor chip mounted over the top surface of the module board, including first circuits operated by a first frequency and second circuits operated by a second frequency;

a first semiconductor chip disposed so as to overlie over the second semiconductor chip, including the first circuit and the second circuit; and

a plurality of conductive wires electrically bonding the first semiconductor chip to the printed wiring board,

wherein the first circuit of the first semiconductor chip is disposed opposite to the second circuits of the second semiconductor chip while the second circuit of the first semiconductor chip is disposed opposite to the first circuits of the second semiconductor chip.

2. A semiconductor device according to claim 1,

wherein the first semiconductor chip and the second semiconductor chip each include a third circuit operated with

a third frequency, and

wherein a fourth circuit operated with a fourth frequency, and the third circuit of the first semiconductor chip is disposed opposite to the fourth circuit of the second semiconductor chip while the fourth circuit of the first semiconductor chip is disposed opposite to the third circuit of the second semiconductor chip.

3. A semiconductor device according to claim 1, further comprising:

amplifier circuits for amplifying input signals in three stages,

wherein the amplifier circuits in the initial stage of the three stages are installed in the first semiconductor chip, and the amplifier circuits in second and third stages, respectively, are installed in the second semiconductor chip.

4. A semiconductor device according to claim 1,

wherein the first and second frequencies are $880 \text{ MHz} \leq$ the first frequency $\leq 915 \text{ MHz}$, and $1710 \text{ MHz} \leq$ the second frequency $\leq 1785 \text{ MHz}$, respectively.

5. A semiconductor device according to claim 1,

wherein the second semiconductor chip is electrically bonded to the printed wiring board with conductive wires.

6. A semiconductor device according to claim 1,
wherein the second semiconductor chip is bonded to the
printed wiring board by flip bonding.

7. A semiconductor device according to claim 6, wherein
a first wire electrically bonded to the first circuit of the
first semiconductor chip is disposed opposite to a first wiring
of the printed wiring board, electrically bonded to the second
circuits of the second semiconductor chip, respectively,
while a second wire electrically bonded to the second
circuit of the first semiconductor chip is disposed opposite
to a second wiring of the printed wiring board, electrically
bonded to the first circuits of the second semiconductor chip,
respectively.

8. A semiconductor device comprising:
a printed wiring board having a top surface, and a
backside surface, on the side of the printed wiring board,
opposite from the top surface;
a second semiconductor chip mounted over the top surface
of the module board, including first circuits operated by a
first frequency, second circuits operated by a second
frequency; a plurality of first electrodes bonded to the first
circuits, respectively, and a plurality of second electrodes

bonded to the second circuits, respectively;

a first semiconductor chip disposed so as to overlie over the second semiconductor chip, including the first circuit, the second circuit, a plurality of first electrodes bonded to the first circuit, and a plurality of second electrodes bonded to the second circuit; and

a plurality of wires electrically bonding the first semiconductor chip and the second semiconductor chip to the printed wiring board, respectively,

wherein the plurality of wires bonded to the plurality of first electrodes and second electrodes of the first semiconductor chip, respectively, are disposed so as to cross a pair of sides, opposed to each other, of a top surface of the first semiconductor chip, extending in a direction intersecting a direction in which the first pads of the second semiconductor chip are arranged, and

wherein the plurality of wires bonded to the plurality of first electrodes and second electrodes of the second semiconductor chip, respectively, are disposed so as to cross a pair of sides, opposed to each other, of a top surface of the second semiconductor chip, extending in a direction intersecting a direction in which the first electrodes of the

first semiconductor chip are arranged.

9. A semiconductor device according to claim 8,
wherein a wiring direction of the plurality of wires
bonded to the plurality of first electrodes and second
electrodes of the first semiconductor chip, respectively,
intersects a wiring direction of the plurality of wires bonded
to the plurality of first electrodes and second electrodes of
the second semiconductor chip, respectively, at right angles.

10. A semiconductor device comprising:
a printed wiring board having a top surface, and a
backside surface, on the side of the printed wiring board,
opposite from the top surface;
a second semiconductor chip mounted over the top surface
of the module board, including first circuits operated by a
first frequency and second circuits operated by a second
frequency;
a first semiconductor chip disposed so as to overlie over
the second semiconductor chip, including the first circuit and
the second circuit; and
a plurality of conductive wires electrically bonding the
first semiconductor chip to the printed wiring board,
wherein a wiring layer for GND is provided between the

first circuit and the second circuit of the first semiconductor chip and a wiring layer for GND is provided between the first circuits and the second circuits of the second semiconductor chip.

11. A semiconductor device according to claim 10, wherein the first circuit of the first semiconductor chip is disposed opposite to the second circuits of the second semiconductor chip, and the second circuit of the first semiconductor chip is disposed opposite to the first circuits of the second semiconductor chip.

12. A semiconductor device comprising:

a printed wiring board having a top surface, and a backside surface, on the side of the printed wiring board, opposite from the top surface;

a second semiconductor chip mounted over the top surface of the module board, including first circuits operated by a first frequency and second circuits operated by a second frequency;

a first semiconductor chip disposed so as to overlie over the second semiconductor chip, including the first circuit and the second circuit; and

a plurality of conductive wires electrically bonding the

first semiconductor chip to the printed wiring board,

wherein the wire bonded to the first circuit of the first semiconductor chip and the wires bonded to the second circuits of the second semiconductor chip, respectively, are disposed in such a way as to face each other, and the wire bonded to the second circuit of the first semiconductor chip, and the wires bonded to the first circuits of the second semiconductor chip, respectively, are disposed in such a way as to face each other.

13. A semiconductor device according to claim 12,

wherein the first circuit of the first semiconductor chip is disposed opposite to the second circuits of the second semiconductor chip, respectively, and the second circuit of the first semiconductor chip is disposed opposite to the first circuits of the second semiconductor chip, respectively.